JPRS-ESA-84-011

24 April 1984

East Europe Report

SCIENCE & TECHNOLOGY

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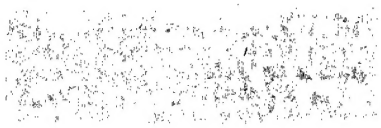

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SCIENCE & TECHNOLOGY

CONTENTS

HUNGARY

YUGOSLAVIA

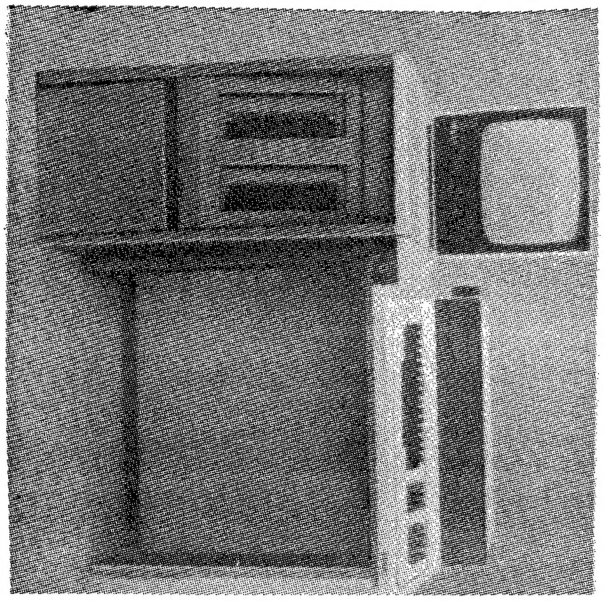
IZOT 1002 C WORD PROCESSING SYSTEM -- TECHNICAL DATA

East Berlin RECHENTECHNIK/DATENVERARBEITUNG in German Vol 19 No 12, Dec 83 p 36

[Advertisement]

[Text] Applications. The IZOT 1002 C word processor is used to automate typing and text processing in typing, editing and printing offices. Other applications are document compilation in research and development as well as making office work more efficient in large industrial and agricultural offices. The components in the word processor are integrated for a standalone work station.

Technical Parameters:
--control nucleus based on an 8-bit microprocessor
--48K bytes of RAM
--up to 1,920 characters on a screen
--standard Cyrillic and Latin keyboard
--function keys for editing and text processing with clear text
--YeS 5074 floppy disk units for external storage
--YeS 7187 alphanumeric printer
--power required is 220 V, 50 Hz



Functions:
--text entry and storage on external storage
--automatic formatting of text entered
--sentence, word or character correction, insertion or deletion
--text assembly from boilerplates
--repeat writing

Exporter: IZOTIMPEX AHO, 51 Chapayev St., Sofia, Bulgaria.
Telephone: 74-61-51. Telex: 022732, 022731.

8545
CSO: 2302/24

'DIGIGRAF' GRAPHIC OUTPUT UNITS

East Berlin RECHENTECHNIK/DATENVERARBEITUNG in German Vol 20 No 1, Jan 83 back cover

[Text] CSSR graphic output units have been used for many years in the GDR.

The YeS 7054 or Digigraf 1612-3G (1008-3G) automatic plotter can be used on-line with Unified System computers or off-line through a perforated tape reader. The Dapos D-3G.10 (D-3G.11) control electronics are housed in a separate cabinet which also contains the plotter controls. The 1612.1 (1008.1) plotting table has a usable area of 1600 x 1200 mm (1000 x 800 mm), maximum speed of 100 mm/s (250 mm/s) and a basic step of 0.05 mm while drawing.

The improved Digigraf 1712-3.5G (1208-3.5G) plotting table differs from its predecessors by these features:
--horizontal drawing area
--two-sided plotting arm bearing; the arm is driven by two mechanically independent, electronically controlled hyper servo motors -- thereby ensuring better arm rectangularity
--improved construction of plotting table frame with better rigidity; control electronics are housed in the cabinet free space; there is no longer a separate control cabinet
--reduction of basic step size to 0.01 mm.

In the basic model, the plotting table has with a combined 2-pen (4-pen) head equipped which enables drawing with two ball-point pens and two ink pens. Accessories available include engraving head, picking and cutting heads. The plotting media sticks electrostatically to the table.

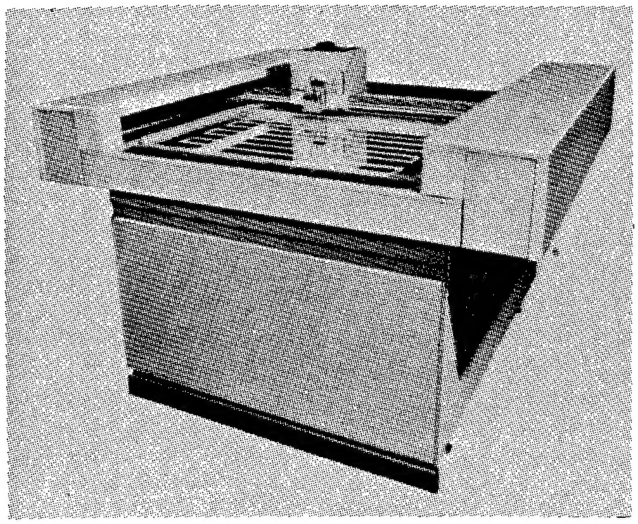
The Digigraf can be used online with series-2 Unified System computers or off-line with a perforated tape reader or the PT 105-1 magnetic tape drive.

It is a component in the YeS 7907 graphic input/output system (see rd [RECHENTECHNIK/DATENVERARBEITUNG] 8/78, page 21), the YeS 7941 graphics system (for design automation), the YeS 7942 process system and the Digikart automated cartographic system.

Also available as the DIGIPLOT system is the combination of the 1208-3.5G plotting table with a microcomputer system (e.g. the Interdata 5/16, SM 4-20 or other SKR [Small Computer System] computer.

Specifications

Type	1712-3.5G	1208-3.5G
Plotting area	1682 x 1189 mm	1189 x 841 mm
Plotter speed	250 mm/s	400 mm/s
Step size	0.01 mm	
Static positioning accuracy	0.03 mm	
Repeatability	±0.02 mm	
Acceleration, selectable by control program	0.05 to 1.5 m/s^2	0.05 to 3.0 m/s^2
Plotter accuracy at acceleration up		
to 50 mm/s^2	±0.05 mm	
to 200 mm/s^2	±0.10 mm	
to 800 mm/s^2	±0.15 mm	
Power requirements		
voltage	220 V + 10% - 15%	
frequency	50 Hz	
draw	about 1500 VA	
Dimensions		
length	2000 mm	1750 mm
width	2200 mm	1800 mm
height	1200 mm	1200 mm
Weight	700 kg	500 kg
Operating conditions		
ambient temperature	+10 to +35°C	
relative humidity	40 to 70 %	
dust formation	max. 0.2 mg/m^3	



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COMPUTER, MICROCOMPUTER PROGRAM COMPATIBILITY STUDIED

East Berlin RECHENTECHNIK/DATENVERARBEITUNG in German Vol 19 No 10, Oct 82 pp 5-9

[Article by Dr Dieter Jungmann, College of Engineering, Dresden: "Program and Data Compatibility of Computers"]

[Text] Until the introduction of worldwide standardized architectural principles like those of the ESER (Uniform Electronic Data Processing System) I/II for universal EDPS (R 21, 1971) and of the SKR (minicomputer system) for minicomputers (K 1620, 1981), the development of digital electronic computer technology in the GDR was typically marked by a lack of program compatibility when making a transition to a successor computer.

The manufacturers of computer systems have offered to the users only to an insufficient extent the internationally widespread principles for guaranteeing transferability of programs (portability by means of compilers or compatibility by means of an intrepretative simulator).

With the appearance of powerful and especially economical microprocessors (U 808, U 880), which are not compatible with ESER and SKR, however, the problem exists of guaranteeing program compatibility. Because of the expected far greater reach of these microprocessors, the problem takes up a new aspect.

The object of this paper is to present in a clear fashion results in the area of guaranteeing compatibility, results which were obtained in the computer center of Dresden Engineering College since 1969 (about 30 projects) as well as results that are known from the literature. This is intended to stimulate further application and development.

1. Requirements for Portability

In agreement with Ovenhausen /1/, the following portability conditions must be adhered to:

P1: Error-free translation of the source program of one machine on another machine.

P2: The object program created during the translation (machine program) must generate the same output data for the same input data.

P3: The running-time characteristics of the translating machine program must be economically reasonable.

While conditions P1 and P2 must absolutely be fulfilled and thus represent absolute quantities, portability condition P3 is a relative quantity. This yields the requirement that the abstract machine, on which a programming language is based, must be imaged on a reel machine during the compiler implementation, in such a fashion that the portability conditions are adhered to.

Portability condition P3 is especially critical. With a specific portability (a programming language should be executable for an already specified set of target machines), this condition can be made more favorable than in the case of free portability (one compiler implementation is followed by others for other machines).

The essential determinative quantity here is the relation between the abstract data types of a language and the specific data types of a reel automat.

A first breakthrough success in the implementation of portability was achieved with PASCAL /3/. A decisive contribution to this was that the compiler itself was written in PASCAL and was made readily accessible. The PASCAL implementation presented in /4/ guarantees specific compatibility for ESER and SKR.

Based on special requirements according to data types, which effectively support the implementation of commercial projects, the PASCAL implementation for the office computer series robotron 51 xx/5/ does not make portability possible (conditon P1 already is not fulfilled). Relative to microcomputers, copious experience is presented in /8/.

FORTRAN, PL/1, ALGOL, and COBOL are the most frequently used programming languages in the GDR. They guarantee a transfer of source programs from one machine to another (the presence of an appropriate compiler is presupposed) only if source program changes are made and a new function test is undertaken.

2. Concepts for Guaranteeing Compatibility

In analogy to the portability conditions, which hold for source programs in higher programming languages, compatibility conditions will be formulated below for the processing of programs at the machine instruction level on a non-compatible other machine:

K1: Programs on the machine-instruction level of one machine (guest computer, target computer) must be executable unchanged on another machine (host computer).

K2: The execution of the program must always yield the same output data for the same input data.

K3: Because of K2, the running-time characteristics must fulfill at least existing conditions in time-critical regions and must be suitable for the application from an economic perspective:

	SER 2	C 8205	C 8205 Z	d 1840	KSR 4100	KRS 4201	RS 4000	MRES 20	BC 5100	URS 5000	K 2063	SKR	R 300	ESER I	ESER II	BESM 6
SER 2																
C 8205	A.	A				A.										
C 8205 Z	A	A	A			A.										
d 1840	S															
KSR 4100		A														
KRS 4201	A.	A.	A.	S		A.	A.	A	S	(A)	R.	A.	A.	P	M	M
RS 4000	A.	A.	A	M		A.	A.	A	S	(A)	S	S	A.	(A).	M	M
MRES 20	M	M	S	S				A	S	A	S	S				
BC 5100	M	M	R.	(P)					A			(P).		(P).		
URS 5000						S		A			S	S				
K 2063	R.	R.	R.	S	S	R(-)					A.		R.	R.	S	S
K 2662			R					R.		R.	A.	A				
K 2663			R					R.			A.	A				
R 300		(A).	(A).			(A).	(A).						A.	(A).		
R 22						(A)		(A).				R	M	A		
R 40						(A)		(A).				R	A	A		
R 55 M						M		M.				R	M	A	A	S

Figure 1 Overall Survey regarding the Status of Compatibility

A1: Routine processing of programs of the precursor computer(s) requires high time efficiency (at least the same or better price-performance ratio).

A2: Takeover of one or more programs or projects from a parallel computer system (The development costs that are saved compared to reprogramming and the possibility that the application will possibly become useful earlier should be greater than the additional running-time costs).

A3: Development and testing of programs for future and parallel computer systems (The running-time properties are of subordinate significance; the processing of translators, text editors, and other auxiliary programs by means of the compatibility equipment represents an exception /11/.)

Data compatibility must be required for at least one data medium. Data conversion on outside computers will sometimes prove suitable (e.g. R-300 tape to ESER tape /12/).

3. The Current Status of the Application and Implementation of Compatibility Aids

3.1 Overall Survey

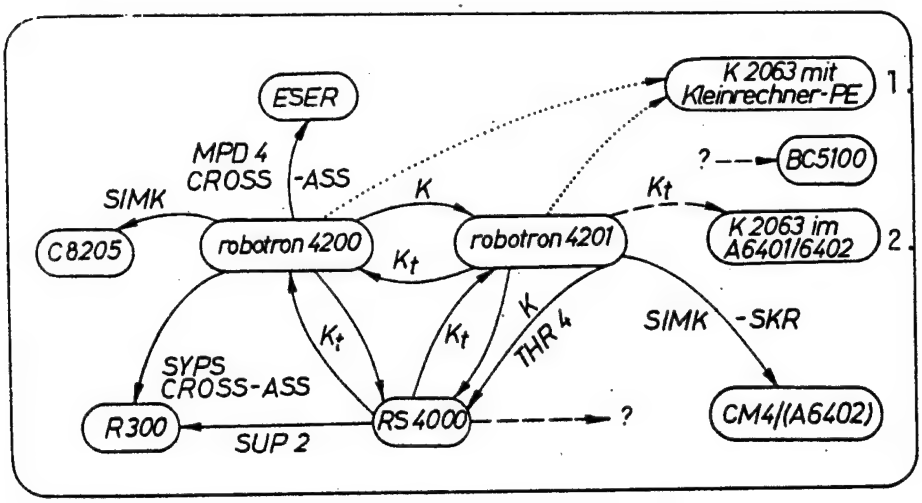

Figure 2 KRS Compatibility

Key:

1. K 2063 with minicomputer PE
2. K 2063 in the 6401/6402

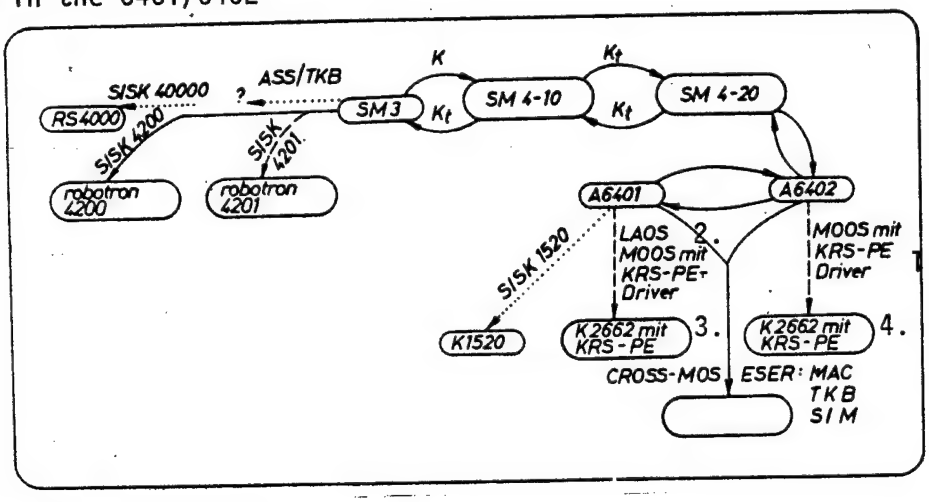

Figure 3 SKR Compatibility

Key:

1. MOOS with KRS-PE driver
2. LAOS MOOS with KRS-PE driver
3. K 2662 with KRS-PE
4. K 2662 with KRS-PE

The matrix shown in Figure 1 represents an updating of Appendix 1 in /19/. It is more extensive with respect to the number of computer systems.

Each line contains a host computer and each column a guest computer. An element of this matrix contains a simulator or emulator which is characterized according to the symbol Y:

Y = A currently in application
R currently in implementation
P planned project
S sensible application which should be implemented, but for whose implementation there is no existing capacity
M possible variant which may be useful under some circumstances
Y project was or is being implemented at the IH (engineering college) Dresden
(Y) restricted implementation, only conditionally useful.

This survey shows that the computer family robotron 4000 has compatibility aids for nearly all computer systems used in the GDR. The reason for this is that the computer systems robotron 200/4201 and 4000 have a relatively high operating speed with a favorable price/performance ration and that they have been available as experimental systems in the computer center of the IH Dresden since 1974.

A detailed presentation by means of a compatibility graph follows for essential compatibility lines in the GDR.

It was most generally attempted to represent a sequence of successor systems along the horizontal, so that an arrow from left to right represents an application A1, an arrow from right to left an application A3, and an arrow to a parallel system an application A2 or A3.

Here, K means complete hardware compatibility, and Kt partial hardward compatibility. In the case of simulation, emulation, or a CROSS assembler, a short product designation is given.

Solid lines represent a compatibility line in actual application, dashed lines one being implementated, and dotted lines a sensible compatibility line.

3.2 KRS (minicomputer simulator) Compatibility

Because of the multiplicity of existing simulators for robotron 4200/4201, this compatibility graph (Figure 2) is shown first. The following sections will make repeated use of this, namely to guarantee compatibility indirectly through minicomputer compatibility.

From an economic perspective, it is highly significant to guarantee the compatibility of minicomputers because, at the present time, this minicomputer system in every respect (number of systems, basic value of investment, scope of system documentation with a value of several hundred million marks) occupies a dominating position among the minicomputers.

A direct substitution line is the emulator K 2063 which can be used in all models of the K 1600 system (KBR A6401, A6402, PR A6901, A6902, etc.).

Nearly all minicomputer programs that have hitherto been developed in the GDR would be executable on all minicomputers or microcomputers that were produced or imported after 1980. Substitute solutions such as the minicomputer simulator SIMK-SKR for CM 4 or similarly powerful SKR systems can be used only conditionally. Hardware-compatible but especially software-compatible substitution of the robotron 4000 represents an unsolved problem. Progress in the area of microelectronics, however, leads one to expect a solution after 1985. Independent of this, the robotron 4000 users should decide to use portable programming systems (e.g. CDL 4000/PLOS or BOVS of the finance organizations).

More attention should be paid to modernizing the existing minicomputers of the robotron 4200/4201 system. For example, the robotron 4201 system does indeed allow in principle a conversion to 32 K words main storage and further connection controls, but there are scarcely any possibilities for the robotron 4200.

Here too, the application of the emulator in combination with electronic modules of the K 1600 system represents a feasible solution. This consists in replacing the central unit of the minicomputer by a block insert module of the K 1600, which is to be equipped with connection controls such that the peripherals of the minicomputer can continue to be used (connection control AIP for SIF-1000 units, AKP for KPS ISOT 1370, AIS for VT 340).

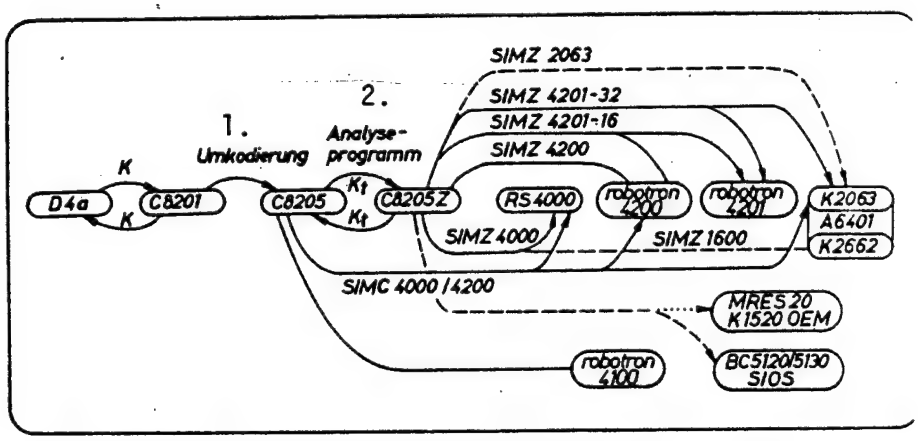

Figure 4 C 8205 (D 4a) Compatibility

Key:

1. Recoding
2. Analytical programs

3.3 SKR Compatibility

The compatibility lines shown in Figure 3 contain not only the hardware compatibility relations within the SKR but also applications of Class A 3 (cross software).

More explanations on this topic are contained in /11/. Users who intend to develop their programs on the assembler level should note very carefully the existing architectural differences between the individual SKR models. This is especially critical if a comparison system is used for program development.

The currently only usable cross system is the simulator SISK 4200, which represents a complete simulation of a CM3 and thus also allows the processing of control-program systems with low time efficiency.

3.4 C-8205 (Z)-Compatibility

Estimates indicated that, at the present time, far more than 1,000 systems of type C 8205 and C 8205Z must still be replaced by about 1985 (ten years after production stop). A major portion of the users will not be able to meet the existing government regulations regarding the load factors for a K 1600 system (twelve hours per calendar day).

If the joining together of several users to a community station with a K 1600 is not possible, the logical step is to use an office computer or a comparable K-1520 product. Figure 4 gives an overview of this.

3.5 ESER-I/II-Compatibility

Figure 5 shows the replacement sequence of ESER models of the VEB Combine Robotron and the Minsk producer. Furthermore, Figure 5 shows the efforts that have been made since 1972 in the computer center of the IH Dresden, to develop ESER programs for training purposes on non-compatible systems (ESSI, SIME 4000), and to guarantee their routine processing of ESER system programs and user programs on minicomputers.

The development conception anticipates that CDL will be used as the implementation language. This represents a compromise between time efficiency and the requirement for transferability through several host computers (K 2063, robotron 4201, A 6402, CM 4).

Only with the K 2063 is it possible to displace time-intensive architectural components-- such as the central control loop--into the micro level. An effort is being made to reach approximately the operating speed of the R 20. This architectural implementation at first has only an experimental character.

3.6 R-300-Compatibility

Ten years after the R 300 was no longer produced, a considerable fraction of the systems is still being used. As a result, not only do morally and physically worn-out systems need to be replaced but also sophisticated application projects have arisen during the fifteen years use time of the R 300, which can scarcely be better implemented by reprogramming for a well configured minicomputer robotron 4201 and

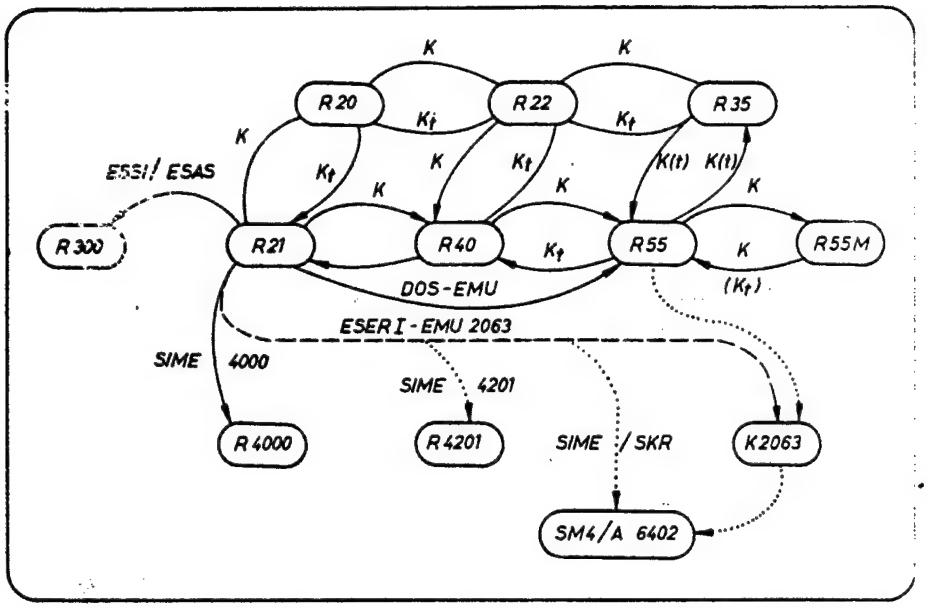

Figure 5 ESER-Compatibility

K 1600. As a restriction, it should be noted that this holds only for the batch operating mode. The extensive use of the R 300 simulator for robotron 4000 and robotron 4201 is suffient proof of this.

At this time, considerations are in progress how the SIMR 4000 simulator can be optimally adapted to the emulator processor K 2063, in order to avoid the double I/O simulation with the SIMR 4201.

For R 300 users, who use an ESER system with reloadable microprogram memory (EC 1055 M and EC 1035) as a successor system, the possibility exists of optimizing the existing R 300 simulators of Magdeburg Technical College and of the VEB Data Processing Center, Berlin /21/, by means of vertical displacement of the central control loop and other time-intensive routines (e.g. conversion of addresses) into the microlevel. It is to be expected that this will achieve at least a doubling of the simulated operating speed.

When microprogramming was introduced, only the manufacturer was able to use this technique. However, in recent years, microprogramming has penetrated from large-scale computers /22/ down to microprocessors /23/ in certain application areas (user microprogramming) /24/. It has thus established itself as an independent professional discipline (firmware engineering /25/). The problem of R 300 emulation, which now must be solved, thus represents a major challenge for the relevant groups of users.

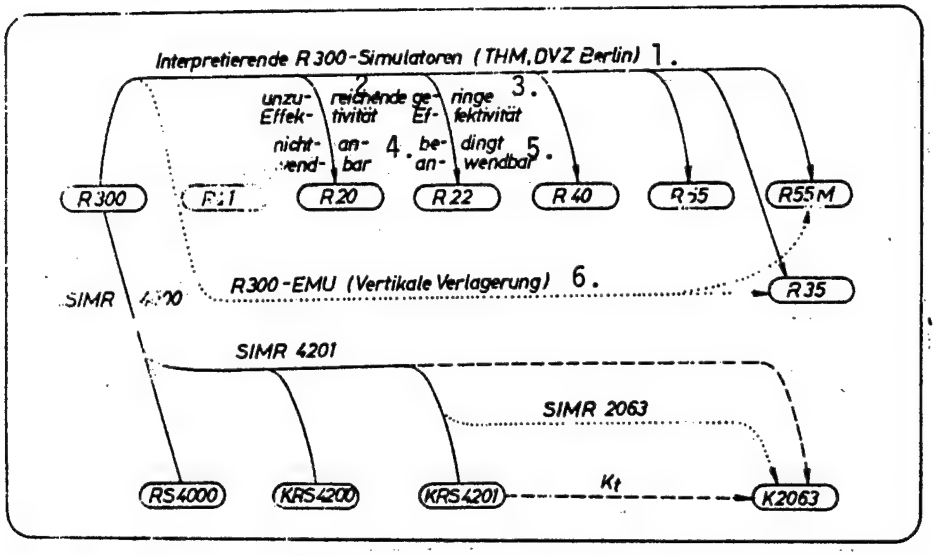

Figure 6 R-300-Compatibility

Key:

1. Interpretative R 300 simulators (THM, DVS Berlin)
2. Inadequate efficiency
3. Low efficiency
4. Not usable
5. Conditionally usable
6. Vertical displacement

3.7 Other Compatibility Problems

Although the robotron 4100 was not manufactured in very large numbers of units, an effective compatibility solution could be very useful in some cases. To a first approximation, the problem can be solved in such a fashion that only a changed instruction decoding in a modified microprogram memory are implemented for the K 2063. Because of the relatively low operating speed of the robotron 4100, it is to be expected that the emulator will become much faster. Because of its compatibility to the PDP 8 and TPA, a variant with extended usefulness will result.

3.8 Pointers Concerning the Use of Compatibility Equipment

At the beginning of our work we constantly had to deal with the counterthesis, "compatibility equipment tempts the user to carelessness in his preparations." From approximately 800 follow-up users of SIMC and SIMZ 4200, experience shows that this applies only in exceptional cases.

There were users of simulators who mastered neither the host computer nor the guest computer and the project being processed. It is not surprising if many prob-

lems thus occur. In such cases, it is necessary first to demonstrate mastery of the continuing project on the original computer and simultaneously to work out information and skills which are normal for operators of the original system.

Surely, it would also be quite natural to offer to inexperienced users training courses for the simulated (virtual) system just as for a real system. Another important perspective for the developer of compatibility aids is that the documentation offered includes not only the non-redundant user documentation but also a pedagogically prepared introductory document. Just as with the original system, the user should operate the test programs and should be able to use them properly so as to be able to exclude suspected hardware errors.

The protocol commands make it possible for the user to determine the causes of erroneous executions, and to eliminate these causes. This type of program testing is often more effective than on the original system, where supplementary, generally restricted test programs had to be used. In the case of follow-up use, the contract should be concluded in such a fashion that the developer demonstrates the executability of the project on the simulated computer. Only he is capable of effectively determining possible error sources.

4. Outlook

The fact that programming is mainly done in assembler language has as its consequence that manufacturers or specialized user groups will still have to take care of guaranteeing compatibility for an extended time period (at least until 1990).

It is to be expected that, with minicomputers and microcomputers, the breakthrough to the predominant use of higher programming languages will occur earlier due to the more favorable price/performance ratio and due to the existing or expected supply of effective compilers (PASCAL). Languages and their implementation with a specific portability are here especially important.

The international top position in this area is determined by developments in which the most suitable firmware and hardware is developed starting from the most modern insights of software development.

The field of minicomputers is increasingly being dominated by 32-bit computers, which extend far into the performance range of previous large-scale computers, and which offer compatibility with the 16-bit precursor architectures. The performance of previous typical 16-bit minicomputers is achieved by 16-bit microprocessors in the lower and middle range. New architectures are being introduced here and proven minicomputer architectures are also being retained. This offers the advantage of further software utilization. On the other hand, the concept of the portable compiler offers the possibility of operating with an abstract automat, which is influenced by the underlying specific processor only as regards efficiency.

A direction that is already being delineated is that the microprocessor has available only a freely formable micro-architecture, which can adapt both to traditional and innovative architectures.

References

/1/ Ovenhausen, H.: Specific Portability of Software. 3. GI Annual Meeting. Springer Publishers, Berlin (West), p 198-209.

/2/ Sima, D.: Formal Description of the Logical Architecture of Computer Systems. Scientific Papers of the IH Dresden, 5/6, 1977.

/3/ Wirth, N.: The Design of a PASCAL Compiler, Software Practice and Experience 1 (1971), p 309-333.

/4/ PASCAL Applications for ESER and SKR. rd, supplementary issue 3/1981.

/5/ Hoffmann, P.: Karl, H.U.: PASCAL 1520. EDP Aspects, 1/1982.

/6/ Johnson, S. C.; Ritchie, D.M.: Portability of C Programs and the UNIX-System.

/7/ Buxton, J. M.; Druffel, L. E.: Requirements for an Ada Programming Support Environment: Rational for STONEMAN. Software, Engineering Environments. Huehnke, M. (ed.), North Holland Publ. Co., 1981, p 319-330.

/8/ Remmele, W.: Pascal-Portability-Efficiency-Microcomputer: Thoughts Concerning Experience Gained from Pascal Implementation with Microcomputers. German chapter of the ACM/Reports, 1 PASCAL, Second Congress, Kaiserslautern, H. W. Wippermann Teubner Stuttgart, 1979, p 15-146.

/9/ Koster, C. H. A., et al: Software Development in the CDL2 Laboratory, Software Engineering Environments, Huchnke, H. (ed.), North Holland Publ. Co. GMD, 1981, p 97-118.

/10/ Otter, W.; Haenel, Th.; Loeper, H.: CDL 4000/PLOS User Manual. User Materials. Section on information processing. Dresden Technical University, 1978.

/11/ Jungmann, D.; Rothe, I.: Possibilities of Program Developing for the System K 1600. Scientific Papers of the IH Dresden 3/1982.

/12/ Hoffmann, P.; Hatnick, A.; Rothe, I.: User Documentation of the R-300 Simulator for RS 4000. Engineering College Dresden, Computer Center.

/13/ Dellart, G. T.: Use of Macros in Translation of Symbolic Assembly Language of one Computer to Another. Comm. ACM 8 (1965) 12, p 742-748.

/14/ Jungmann, D.: Translation of Application Programs of the Computer Family ROBOTRON 4000 in Executable Programs of the SKR. Engineering College Dresden 1979. Internal Working Report.

/15/ Jungmann, D.: Emulator for Data and Programs of the Minicomputer System Robotron 4200/4201 in the Microcomputer System Robotron K 1600. NTB 26 (1982) 2, p 54-57.

/16/ Rothe, I.; Poeckel, A.: User Documentation for the SKR Simulator for Robotron 4200/4201-SISK 4200. Engineering College Dresden, Computer Center.

/17/ Jungmann, D.: User Documentation of the C8205Z Simulator for KRS 4200/4201-SIMZ 4201-32. Engineering College Dresden, Computer Center.

/18/ Poeckel, A.: User Documentation of the SER2 (a, b, c, d) Simulator for KRS 4200. Engineering College Dresden, Computer Center.

/19/ Jungmann, D.: Simulation of Digital Computers--Techniques and Technologies of Program Implementation of Digital Computers. IH Dresden, Dissertation A, 1977.

/20/ von Krogh, C.: Microprogramming of the IBM Systems--370-125. Computer Structures. Hasselmeier/Spruth (Editors), Oldenbourg, 1974, p 75-103.

/21/ Fröhlich, K.: R-300 Projects on System of the ESER Program Packet for Execution in OS/ES. rd. 7 (1977), p 23-26.

/22/ Weiss, R.: Problems of Vertical Displacement on a Large Scale Computer GI-NTG. Technical Congress on Construction and Operation of Computer Systems, Kiel 1980, Springer Publishers 1980.

/23/ Weiss, R.: Microprogrammable Microprocessors in New Applications of Data Processing, Oldenbourg, 1980.

/24/ Ramamoorthy, C. V.: A Study of User Microprogrammable Computers SICC 1970. AFIPS Canf, Proc. No. 36, p 165-181.

/25/ Berg, H. K.; Giloi, W. K.; Franta, W. R.: Proposal for a Firmware Engineering Discipline FELCAMP Project. Berlin Technical University (West), Report 79-02, 1979.

/26/ Jungmann, D.: Conception for the Simulation of the BESM6 on the RS 4000. Unpublished Working Material, IH Dresden, 1976.

/27/ Wirth, N.: Lilith. A personal Computer for the Software Engineer. Microcomputer System Design. Springer Publishers, Berlin (West) 1982, p 349-397

8348
CSO: 2302/28

CASSETTE MAGNETIC TAPE UNIT KMBE K 5261

East Berlin RECHENTECHNIK/DATENVERARBEITUNG in German Vol 19 No 10, Oct 82 inside back cover

[Advertisement]

[Text] With the 5261 magnetic tape cassette technology, high performance recording and playback machines are offered as original equipment manufacturer components for data processing and small computer equipment systems.

They implement the international recording method ECMA 34 (in compliance with ISO 3407).

Internationally standardized digital cassettes can be used as a storage medium with these machines.

The tape recording unit KMBE ROBOTRON K5261 combines two KMBG K5200 with a power supply unit within a 19-inch plug-in unit and contains control electronics. The KMBE can be delivered as a built-in unit or a portable device. The same conditions apply for the connection of the KMBE to computers and control units as for the KMBG K5200. This control unit implements the SKR (System of Small Computers) interface IFSS [expansion unknown] among others.

The KMBE K5261 can be connected to the CM4 and is listed in the SKR under the registration no CM5206.

The device is a built-in unit in a 19-inch plug-in unit (SKR plug-in unit).

Tape speed	v_1 = 19 cm/s v_2 = 38 m/s convertible within device
Bit density	32 Bit/mm
Start-stop gap	normal 20.3 mm
Recording and playback speed	6×10^3 Bit/s 12×10^3 Bit/s

Exporter: ROBOTRON EXPORT-IMPORT, VEB Foreign Trade Enterprise of the GDR, GDR--1080 Berlin, Friedrichstrasse 61

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CSO: 2302/31

LEIPZIG 1983 AUTUMN FAIR SHOWS MICROELECTRONICS APPLICATIONS

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 20 No 11, Nov 83 pp 27-29

[Article signed "Fr.": "In the Focal Point: Microelectronics User Solutions"]

[Text] Like the spring fair, this year the autumn fair in Leipzig was also under the aegis of applied microelectronics. Especially in the domain of textile and polygraphic machines, chemical equipment, plastics machines and medical technology microelectronic methods were the dominant theme of the offerings presented by exhibitors.

Industrial robots, office computers, microcalculators and microelectronic controls documented scientific and technical progress once more in the exhibits of the autumn fair more strikingly than in previous years. Interscola '83 with microelectronic educational and teaching aids, ERAM Autumn '83--an international symposium attended by specialists from 29 countries--and the Microelectronic Information Center rounded out the picture. This year's autumn fair also proved that the GDR has moved ahead in the broad applications of microelectronics. The editors of this journal present herewith in their fall report some interesting products among the microelectronics offerings of the exhibitors.

Microelectronic Information Center

First of all, the autumn fair visitor interested in exhibits employing microelectronics could get a survey in the Microelectronic Information Center. This visitor service initiated in the '83 spring fair awaited him in Hall 7. An ample choice of prospectuses announced a number of novelties exhibited at the fair--unfortunately, there was also distributed some confusing prospectus material from the Leipzig Spring Fair of '83. Numerous monitor screens in color showed manufacturing techniques and applications of microelectronics. The visitors had diverse interests. Frequently the expert visitor looked in vain for advice as to where he might find a particular product and as to how he might make contacts supplying information ranging beyond that contained in the fair catalogue.

In the background the Textima Combine presented an impressive application of microelectronics in the area of textile machines.

Textile Machines

Far out in front and awarded the fair gold medal was the jacquard flat knitting automatic machine of the 5480 series developed by the VEB Elite-Diamant in Karl Marx City and by the VEB Textima-elektronic in Karl Marx City which was provided with a control operating through the office computer A5120. The A5120 permits on-the-table pattern preparation with monitor and two diskette drives. It substantially improves programming control and permits easy correction via the monitor. As a further development of the earlier punched tape operation, there are stored on diskette more pattern possibilities for guidance and pattern manipulation; pattern changing is carried out quickly.

In a nearby exhibit Textima showed the flat knitting automatic machine 5479/6 which is still controlled electromechanically. The operator inserts the control information via an eight-channel punched tape. This punched tape is produced using the pattern preparation device which consists of an input portion and a tape puncher. A punched tape reader can be connected for duplicating. The controlling punched tape thus produced is unencoded and can be easily checked visually.

Besides integrated sewing machines with programmable microelectronic control PS2000/1 based upon the integrated switching network and double carpet weaving machines, Model 4312, with microelectronic control and surveillance technology, the combine exhibited the technological articulated robot TR79. This has been developed by the VEB Spinning and Threading Machine Construction Plant in Karl Marx City. It may be used for surface treatment and can dye-spray, scour, load, polish, fine sandblast, dust, buff and dip. The TR79 possesses four to six degrees of freedom and multipoint control (and may be equipped for one-point control). In the memory there are path data for a technological program length of 3 to 10 minutes. An electrical power failure may be bridged up to 15 minutes by a battery-supported RAM storage. The storage capacity of the industrial robot amounts to a maximum of 4 Kbytes of position points and 4 Kbytes of commands: in the memory 16 subprograms are located.

The Textima Combine and its VEB Textima-elektronic, which was founded 3 years ago, proved convincingly to the public at the Leipzig Autumn Fair how robotron device technology and Textima-elektronic can be effectively combined and how modern computer technology is also entering irresistibly into light industry.

This was demonstrated by

Chemical Facilities Construction

in cooperation with the Center for Scientific Equipment Construction of the Academy of Sciences of the GDR (Mytron) in Hall 6. Among others there was exhibited the Laboratory Fermentor System LFS Model 112R with a microcomputer system based upon the K1520 which was exhibited in the configuration monitor,

K2521 and teletype F1219 (as printer). The computer acquisition and control of measurement and regulating parameters simplifies guidance of the complex fermentation process which is associated with a high data inflow. The K1520 records all measurement and target values supplied by the MS*R portion of the system together with alarm and breakdown signals. The software produced in MAPS K1520 is expandable and modifiable by the user. In addition, there are also included in the microcomputer system: OFS K3620 (operative and fixed value storage), OPS K3520 (operations storage), programmable analog/digital converters and selector switches, coupling adapters for teletype and function keyboard, punched tape reader and tape puncher. There are available monitoring, measurement acquisition, conversion and output programs for measurement reporting, alarm signaling and for the tape puncher. Also of interest was the model of a pot furnace control coupled with the A5120 and the robotron 1152 that was also developed by the Center for Equipment Construction of the Academy of Sciences and by the VEB Chemical Facilities Construction Combine in Leipzig-Grimma. Control by means of office computers is employed in vacuum distillation facilities.

Polygraphy

The Polygraph Combine also demonstrated the progress of microelectronics applications, for example, with the SEYPA-PMC fast cutter generation of the VEB Polygraph Cutting Machine Plant, Perfecta, in Bautzen. The traditional analog control by means of magnetic tape which has proven itself well since its introduction in 1958-1960 is here replaced by digital control using the K1520 microcomputer. Altogether, by means of this the SEYPA-PMC possesses 550 storage locations for cutting marks and stores up to 92 job commissions--which means sixfold storage capacity as compared with the magnetic tape control. The K1520 compares the first and the target dimensions of the cutting marks and computes for the repetitive processes the target dimensions of the repetitive cuts. Its use results in a 50- to 80-percent reduction in program recording times and hence up to 80 percent higher speed in comparison to magnetic tape controlled machines with a stationary guide stop for the cutting material. An additional novelty is the introduction of program numbers and cut numbers in place of addresses.

The broad possibilities of text-setting technique employing graphic text-setting terminals, in this case terminals of the GST4000, were exhibited by the Berthold AG Factory (West Berlin) with a multifunction terminal as a universal photographic text-setting workplace for acquisition, correction and data handling. This received the gold medal award of the fair. The lateral monitor SBS3001 which is attached over the separately available work monitor permits automated text makeup (separate storage of text in a supply page and in an assembly page, automatic sorting of text sequences, formatting, automatic text feed, data carrier output and further possibilities). The software consists particularly of line programs and 10 syllable separation programs with an exceptional-words memory, typogram, more than 1,500 different selectable type styles (up to 16 are freely mixable) and programs for typographic configuration, type sizes, text varieties on floppy disk.

* S = target value--Tr.

Industrial Robots

Besides the TR79 of the Textima Combine the automobile manufacturing industry of the GDR, VEB IFA Combine for Personal Automobiles in Karl Marx City also exhibited an IFA articulated robot TR10 for which the IFA Combine at the Leipzig Autumn Fair simultaneously made it possible to acquire licensing. The TR10 possesses five to six degrees of freedom, teach-in programming, 75 different programs and rationalizes the manufacture of personal automobiles.

The Sanyo Seiki Factory (Japan) received the fair's gold medal for the microcomputer-controlled multiarticulated NC robot called the "Sankyo SKILAM," Model SR3. The robot stores up to 6 Kbytes and has simultaneous control for three axes and one axis. It is programmed by the input of XY coordinates in the robot language SERF developed by Sanyo Seiki and through the microelectronics based upon the Z80 microprocessor.

Laboratory and Medical Technology

In the Bugra Fair Building the laboratory and medical technology of the GDR exhibited new applications of microelectronics in addition to the already familiar system configurations DOPSY, NATALI and MARMEDO of the VEB Robotron Combine (already described in detail in this journal). The VEB Measurement Instrument Plant in Zwoenitz, a factory of the VEB Communications Electronics Combine, developed the microprocessor-controlled 8/10-channel electroencephalograph RFT BIOSCRIPT BST2100 for automatic forefield diagnosis. It documents alphanumeric patient data and electroencephalogram parameters and serves for on-line EEG analysis for which it possesses an electronic program storage and an integrated photo-phono stimulator.

Mention should be made of the new irradiation spectrophotometers, by the VEB Carl Zeiss in Jena, from the SPEKOL 200 series which were developed in cooperation with ISKRA/SFRY and which operate using microelectronic control (basis: integrated TTL switching network).

Interscola '83

In the fair building "Am Markt" for the 14th time visitors were awaited at the traditional educational exposition with teaching aids, devices for instructional cabinets in professional schools, high schools and technical schools. Among other things, the VEB Robotron-Messelektronik "Otto Schoen" in Dresden offered equipment for laboratories engaged in measuring techniques (foundations of electrotechnology, electronics, the technique of measuring nuclear radiation) and for the training cabinet in radio and television technology. At the Interscola there also participated exhibitors from the People's Republic of Poland, of Czechoslovakia, Hungary and Bulgaria. The complex of teaching devices exhibited in the USSR pavilion (Hall 12) for the automation of seminar rooms on the basis of the Elektronika A-60 microcomputer would have also been well-suited to the Interscola program. This complex should be useful in building up autonomous [educational] workplaces in automated lecture rooms of technical schools and upper schools.

Those exhibited technical instructional aids, particularly for occupational training, including the microelectronics employed--for example, the polycomputer 880 and others--displayed a high level of quality. Their better employment for the immediate advertising activity of the fair would have improved the Microelectronic Information Center and would have been able to appreciably enlivened some of the lectures at the ERAM '83 and would have provided a better overview by means of pictures and graphics instead of sober word-and-paper information.

PHOTO CAPTIONS

1. p 27. Jacquard flat knitting automatic machine with office computer A5120.

2. p 27. KUASY 60/20 injection molding machine, a new development equipped with microelectronics components from the Wiehe Plastics Machinery Works of the VEB Erfurt Forming Machinery Combine.

3. p 28. GST4000 from the Berthold AG Factory (West Berlin)--efficient photographic text-setting system.

4. p 28. Multiarticulated NC robot from Sanyo Seiki (Japan).

8008
CSO: 2302/23

U 8032 D ARITHMETIC PROCESSING UNIT

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 33 No 2, Feb 84 p 67

[Text] The U 8032 D integrated circuit from the Microelectronics Research and Technology Center VEB is a 16-bit arithmetic processing unit (APU), programmable through micro instructions; it can be coupled to handle 32- and 64-bit words. It is used to make fast arithmetic processors with larger processing widths for 8- and 16-bit microcomputer systems. Both fixed- and floating-point formats are handled for addition, subtraction, multiplication, division, fast left and right shifts as well as conversions with the available micro instructions.

Processing by a multiplier field produces especially fast processing times for MUL, DIV and shifts. FK 16 multiplication and filter functions (MUF) are linked instruction implementations with correct sign.

Other features:
--39 basic micro instructions
--separate micro instruction and data bus
--8 unrestricted programmable 16-bit registers
--flag formation
--asynchronous operation (without external clock with instruction end acknowledgement)
--technology: nSGT [n-channel silicon-gate], scaled
--TTL compatibility for all pin levels
--5 V operating voltage
--integrated input protection circuits
--48-pin DIL [dual in line] ceramic package
--6.2 mm x 7.4 mm chip size
--15,000 transistors

8545
CSO: 2302/34

ZSG 8000 CONTROLLER WITH MICROCOMPUTER

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 33 No 2, Feb '84 p 68

[Unattributed article]

[Text] The most economical and practical use of electric power is an economic necessity of growing importance.

The ZSG 8000 central controller for ESH electric storage heaters (with load control) has been developed by the Rostock Dwelling Construction Combine together with the Rostock Energy Combine and the Rostock Marine Electronics VEB.

The ZSG 8000 is a low-cost, microprocessor-based controller which can regulate ESH electric storage heaters, the energy consumption of which depends on weather and time; in special cases, it can be overridden by an analog control voltage influenced by the energy consumer.

Essential parameters for the controller are:
--maximum of 1,600 ESH units connectable
--four modes of operation controllable by remote control signals
--four unrestricted programmable control curves, each with a maximum 24-hour cycle
--automatic complex self-monitoring and alarm message reporting.

Using the ZSG 8000 produces these advantages:
--proven energy savings between 14 and 26 percent
--increased service life of low-voltage power switches and cable through controlled load operation
--reduction in ESH unit operating time
--more cost-effective operational management by ZSG 8000 operating modes
--increased supply reliability and capability of remote monitoring and remote control
--adjustment to energy supply (post-valley) and avoidance of load peaks
--situation-oriented energy allocation by selectable control curves
--avoidance of booster reaction.

With its unrestricted programmability, the ZSG 8000 is capable of handling the most diverse control tasks, e.g. for refrigeration plants, hot water storage, uncontrollable night storage heaters and remote heat supply.

A patent application has been filed for the ZSG 8000; the controller has been available since the end of 1983.

Send inquiries to: Rostock Marine Electronics VEB, 2510 Rostock 5, PSF [Post Office Box] 85, Abt. [Department] EFE.

8545
CSO: 2302/34

BRIEFS

ROBOT TESTS CIRCUIT BOARDS--It takes a robot in the VEB Telecommunications Factory, Bautzen just 3-1/2 minutes to test a circuit board. Previously about 7 hours were required for this task. The robots developed by young innovators in the company test 16 of the most important board types produced by the factory. The particular inspection program can trigger up to 999 measurement steps which can be selected by the robots as appropriate for the board being tested. Possible defects in the board are immediately signaled and can be located and removed with the aid of a measuring strategy. The three-shift application of the robots helps to save 25,000 man hours per year in the Telecommunications Factory, Bautzen. [Text] [East Berlin RECHENTECHNIK/DATENVERARBEITUNG in German Vol 21 No 2, Feb 84 p 21] 9160

CM 4-20, EC 1025 USERS' CONFERENCE--The CSSR foreign trade company KOVO invited present and future users of the EC 1025 and CM 4-20 installations to Berlin from November 16 through 18, 1982. Specialists from Kancelarske Stroje, the manufacturer of the EC 1025, presented information about their latest model, has among other things a higher operating speed (75,000 per second) and consumes up to 35 percent less energy than its predecessor. It reads and writes at higher speeds and possesses as an optional feature, a desk-top punched-card reader (Arithma) EC 6112. The CM 4-20 system--more than 10 of which have been installed to date in the GDR--was the focal point of the second-day's discussions. Here software and hardware experts presented information covering the current state of development and planned projects. Architecture and program provisioning for systems of the SMEP II series (the CM 4-20 minicomputer is a member of the SMEP I series) were presented in a series of technical papers. [Text] [East Berlin RECHENTECHNIK/DATENVERARBEITUNG in German Vol 20 No 1, Jan 83 p 3] 9160

NEW MEASURING COMPUTER DEVELOPED--A measuring [instrumentation] computer for electronic components and circuits has been developed in the VEB Instrumentation Electronics, Berlin. In telecommunications engineering, the new device will quickly locate faults in conductors, for example. The microcomputer-programmable control and display device makes it possible to run a series of measurements automatically. The microcomputer assumes the test control function and decides which programs to use. The measured values appear immediately as curves or tables on a CRT. In addition to electronics measurements, the instrumentation computer also makes possible automated measurement programs in the fields of mechanics, thermodynamics, biology and medicine. The programs required for this were developed in the VEB Instrumentation Electronics. Accordingly, this subsidiary of the Telecommunications Electronics combine is in the position to make the software available to the users of the instrumentation computer. To date, over 170 combines and factories have expressed their interest in such an instrumentation computer. [Text] [East Berlin RECHENTECHNIK/ DATENVERARBEITUNG in German Vol 21 No 2, Feb 1984 p 2] 9160

CSO: 2302/29

SOVIET ES 1045.01 COMPUTER INSTALLED IN HUNGARY

Budapest SZAMITASTECHNIKA in Hungarian Mar 84 p 1

[Text] The first Soviet ES 1045.01 has been put into operation amid considerable ceremony at the Csalogany ut headquarters of SZAMALK [Computer Technology Applications Enterprise] in Budapest. According to Janos Juhar, managing director of SZAMALK, delivery of the system provides the opportunity for new applications and services. Also present at the ceremony was Viktor Otcheretyin, Soviet commercial representative to Hungary, who stressed the importance of the Hungarian-Soviet computer and microelectronics agreements. He said that 400 Hungarian 1010 and 1011 systems are operating in the USSR while Hungary operates 200 Soviet systems. He added that although trade in computer equipment will amount to 160 million-170 million rubles in 1984, it could quadruple through increased trade of parts and components thereby saving both parties substantial amounts of convertible currency. This shipment to SZAMALK will be followed by additional deliveries this year.

The ES 1045.01 is the first large dialogue-oriented computer in Hungary. Its hardware and software architecture are designed for extremely reliable operation. All requirements for modern data processing in dialogue mode are available through virtual memory handling, advanced diagnostic and self correcting hard and software components, high operating speed combined with opportunities provided by modern operating systems as well as the various target-oriented data bases.

The capacity of the central unit is a one plus three M byte, semiconductor store. This is linked to a four-block and two-byte multiplexer channel. The present capacity of the direct-access, backup stores (ES 5667 and 5067.02) is 800 M bytes. According to plan, this can be increased to 2G bytes. ES 5025.03 type 800/1600 bpi magnetic tapes, two ES 6019 punch card readers, two 7033 line printers and a 60-terminal subsystem belong to the system. Of these, the intention is to operate 32 (from the USSR and Poland) as local terminals. The operating speed of the central unit is 800,000 operations per second.

Efficient functioning of the system is supported by the OS 6.1 operating system, the OS/VSI and DOS/VS-based operating system, the GUTS time-sharing system, the SHADOW-II TAF [remote data processing] monitor, the IDMS data base management system, translation programs and modern TAF access modes.

By putting the large system into operation, SZAMALK intends to foster widespread use of ES computers in the dialogue mode and to provide the possibility of managing large data bases. The system is compatible with ES series one and two computers. An ES 1035 system is also in operation at the computer center.

CSO: 2502/43

CENTRAL DEVELOPMENT PROGRAM ON BIOTECHNOLOGY DISCUSSED

Budapest OTLET in Hungarian 22 Mar 84 p 8

[Summary] Recently, research in biotechnology has become one of the central development programs of the National Medium-Term Research and Development Plan. Implementation is being coordinated by the OMFB [National Technical Development Committee] chiefly through the Office of Protein and Biotechnology two of whose members, Pal U. Kralovanszky and Artur Wieland, provided the information presented below.

The program is intended to expedite application of research findings so that they can be put to use within 4-5 years. The areas included in the program are primarily ones on which specialists have been working for a number of years but for whose application the necessary support background must be established. Once the projects in the program are successfully completed, we expect the end products to realize 60 million-80 million dollars for us in either exports or savings in imports. This will depend largely on how much money is available to the economy for the necessary investments. The OMFB is supporting the program with 140 million forints. The enterprises and ministries will spend double this amount on biotechnology R&D in 1984-1985. However, this will suffice only for the development of products ready for manufacturing. The enterprises must use their development funds or bank credits to finance investments which will establish production prerequisites.

To economize on the need for hard currency, the program supports not only product-oriented research but domestic development of facilities and equipment needed for production. Hungary will make no attempt to invest in the costly, high-speed centrifuges needed for cell separation. On the other hand, Hungarian industry can easily make the special apparatus, containers, fermenting equipment required in production of pharmaceuticals. Good organization and assignment of responsibility are all that is necessary. At present, there are hardly any specialists who have the theoretical background in genetics, microbiology, biochemistry and the techniques used in genetic engineering. Representatives of the various disciplines find it hard to communicate and cooperate because of their diverse training. As a temporary solution, biologists are being taught certain engineering techniques while education in biological genetic engineering is being promoted at the technical university.

CSO: 2502/44

DIVISION OF LABOR, STATISTICS ON ROBOTS REPORTED

Budapest OTLET in Hungarian 5 Apr 84 p 13

[Text] According to statistics from the CEMA secretariat, the number of robots, including mechanical assistance devices, within the USSR increased to 6,600 in the course of the present plan period. By 1986, a total of 40,000 are to be in use. The other CEMA countries had 230-250 in 1980 but plans call for the GDR alone to have over 8,000 by 1985 and for 200,000 to be used in production by the end of the decade.

The CEMA secretariat claims that 60 types of robots will be manufactured on a division of labor basis in the socialist countries this year. To date, 150 types of industrial robots have been developed jointly. Production of equipment on the socialist list of robots has been assigned primarily to three countries which will provide 75 percent of the robots required by the member nations. Between 1981-1985, about 1,500 can be exported within CEMA. On the basis of previous agreements, the countries providing the robots will be the USSR, Czechoslovakia and Bulgaria.

It has been decided to concentrate on manufacture of so-called modular system robots which permit separate development of components. Furthermore, use of such robots in some new field will not require manufacture of an entirely new machine for each special use.

It was agreed also that the main purpose of robots was to mechanize taxing physical labor. Priority will be given to manufacture of robots for painting and pouring.

CSO: 2502/50

PRODUCTS, COOPERATION AMONG COMPUTER MANUFACTURERS

Paris ZERO UN INFORMATIQUE HEBDO in French 2 Jan 84 p 32

[Article by Josip Rajman: "The Yugoslav Data-Processing Industry Is Stressing Cooperation With the West"]

> [Text] The largest data-processing and office automation show in Southeast Europe just took place in Sarajevo, the capital of Bosnia-Herzegovina under the sign of the 14th Winter Olympics (8-19 February). Some 20 Yugoslav and foreign companies will indeed offer to help with electronic systems of all kinds, stressing real-time data acquisition. The show made it possible to take stock of the Yugoslav data-processing industry.

A member of the International Show Association, Interbiro decided to focus this year on the results achieved by cooperation between Yugoslav and foreign firms. Among the new exhibitors, we should note the presence of the U.S. companies Megatek, Computer Associates and Computervision.

In Yugoslavia, the emerging robotics industry is beginning to develop, and many efforts are being made in favor of the industries and public services.

Major National Manufacturers

Banex (Zagreb) is manufacturing its own MD-83 asynchronous screen terminal with a transfer rate of up to 19,200 bauds. In addition to a possible synchronous link, this terminal offers a 4-K buffer memory as an option.

Birostroj (Maribor), which has sold over 3,000 of its 1720 office computer in Yugoslavia, is still producing it under the tradename RGB-101 (Robotron-Gorenje-Birostroj) as well as three models of the East German firm's 1500-series (RGB 110, 120 and 130). Birostroj is also distributing Sel Gould products, especially plotters.

Digitron (Buje) is offering the Mael 5700 system which can support up to 8 terminals and a 48-megabyte disk memory. The system is manufactured under a license from the Italian company Corsoli, represented by Velebit (Zagreb). Digitron just added to its catalogue an ASCII terminal (110, 150 and 300

bauds) with a card punch and a card reading unit, and a V-24 interface; an on-line cash register; a printer and teleprinter (ET 2080) printing at 80 cps and built around the Z 80.

Ekonomski Biro (Belgrad) is collaborating with Kienzle and introducing the German firm's Model 9700 under the code name Emok. The Belgrad firm is now installing the Emok 9055 system, the first in the series, on clients' premises.

Elektronska Industrija (Nis) is continuing production of the DPS-6, Models 48, 54, 92 and 96, the 9617 and 9618 line printers, the VIP 7300 and 7874 terminals. Elektronska is also starting production of the 6/10 micros announced by Honeywell earlier this year; it will soon start producing the DPS-8. All central processing units of the other DPS-6 are also manufactured at Nis. Elektronska Industrija is trying to introduce an added value of over 50 percent of parts costs. It manufactures the Robotron S-6000 electronic typewriter and will soon manufacture all the electronic parts of this machine.

Iskra-Delta (Ljubljana) is a partnership between Elektrotehna and Iskra; it employs 750 people, including 200 for research and development. The top-of-the-line "Partner" microcomputer which it is now manufacturing comes with a 128-megabyte memory, a 10-megabyte hard disk unit, diskette units having a total capacity of 1 megabyte, and a 180-cps printer; it sells for about 14,000 French francs.

Iskra Delta also produces the Delta 400-B system. Built around the Z80-A microprocessor, the system is compatible with other Delta computers, as well as with Control Data, DEC and IBM 3278 systems. It comes with a core memory of 512 K that can be expanded to 1024 K, a 50-megabyte disk memory, a 1-megabyte diskette memory, and it can support line printers printing at 300 or 900 lpm.

ISSES (Sofia), Information Systems and System-Engineering Services, is the largest Yugoslav data-processing consulting company. It employs 9,000 people, operates 28 regional computer centers, and specializes in software production, maintenance and training.

Among its main partners, we should mention Interprogramma, IBM, Hewlett-Packard, as well as GFI (French Data-Processing Group) and SIS [Data-Processing and Systems Company].

Novkabel (Novi Sad) is collaborating with the Hungarian firm Videoton (headquartered in Budapest) to manufacture the ERA 20 and 60 systems and the new 60-A model that includes a 1-megabyte memory and supports Control Data 200-megabyte disks. Aided by the Novi Sad university, it just developed a microcomputer with 64 K of core memory that can be expanded to 256 K.

Under a Nixdorf license, Radio Industrija (Zagreb) is manufacturing the 8820 computers sold as RIZ-20, for which it offers specialized software packages for hospitals, exhibitions, garages and post offices.

Rank Xerox has been established in Yugoslavia for 17 years and owns about two thirds of all the copiers installed. Ninety Rank Xerox experts will be in Sarajevo for the games; half of them are Yugoslavs.

Robotron (Dresden) is well represented with some 13,000 electromechanical and electronic machines; at the last Interbiro Show, it introduced its latest system, the A-5220, which is designed for data acquisition and processing. It comes with 88 K of RAM memory and can support 4 diskette units, one 180-cps serial printer, magnetic tape, a 1024-character screen and a wheel printer.

Technicar (Zagreb), which has already installed close to 200 office computers, is now marketing the Tera-3 microcomputer. It has a 64-K memory, is built around a Z-80, and can be connected to diskette or magnetic tape units. The company also manufactures the Tera-119, a 120-cps matrix printer that operates with 132 or 156 characters.

TRS (Zagreb) is represented on the OEM [Original Equipment Manufacturer] market by a conversational terminal (TRS 823) offering a transport rate of 110-9,600 bauds, an asynchronous terminal (TRS 823), a diskette unit (703 TRS), a matrix printer and a small accounting machine (TR 702/12).

Unis (Sarajevo) is manufacturing under NCR, Olivetti and Olympia licenses. It offers the NCR-Imos interactive system (I-9020) with 512 K of memory, which can support up to 24 terminals.

Together with Olivetti, it manufactures the ETS 1010 model, the electronic Lettera 35 typewriter (80,000 units in 1983, 150,000 in 1984) and the Copia 1000 copier. It has been cooperating with Olympia for a long time to manufacture the Traveller typewriter, 300,000 of which are manufactured each year; about 20 percent are sold on the domestic market, and the rest is exported, especially to the Federal Republic of Germany.

Velebit (Zagreb) represents many foreign firms and distributes in particular the Polish EC 8371-01 system which can support up to 16 terminals.

9294
CSO: 3698/352

ACTIVITIES OF UNIS ELECTRONICS, TELECOMMUNICATIONS PLANT

Sarajevo OSLOBODJENJE in Serbo-Croatian 25 Feb 84 p 9

[Article by Alije Behram]

[Text] Since the Unis associated labor organization began 8 years ago to develop the production of certain electronic and telecommunications devices, a powerful nucleus for "future production" has been growing in Mostar. It has been ruled by outside designs, but has traced a path toward independence.

Without much pomp or great publicity, modestly and unnoticed, toward the end of autumn last year production began in Mostar of a data processing system for commercial data under the roof of the Unis labor organization, "Elektronik". It is of domestic design. This winter, buyers will receive the first delivery of these computers, and estimates speak of the complete success of the domestic electronics industry.

We are talking of "6082" processors and "I 9020" calculating systems of the well-known NCR corporation of the United States, which has granted the Bosnia-Hercegovina Unis system material rights to technology that is the most modern achievement of electronics.

Until a few years ago, Unis was just NCR's general agent for marketing computers in Yugoslavia. In the meantime, starting some 8 years ago, the powerful nucleus of an electronics industry has formed in Mostar within the framework of Unis; the Mostar producer has successfully mastered a broad range of production and the most modern electronics achievements. This was the strongest argument for entrusting the producer on the Neretva River with this complex program. What is the value of this endeavor, and what exactly do such products mean for the domestic market?

Domestic Solutions Mean Foreign Exchange Savings

As Zdravko Durasovic, director of the Unis-Elektronik labor organization puts it: "Nothing noteworthy occurred, but instead this truly serious and major objective emerged as the logical consequence of the powerful scope of modern electronics production that the Unis system began in Mostar 8 years ago. In the interim, we have developed an entire spectrum of

electronics products and aided the facilities and the people to keep pace with world achievements in this kind of production. For this program, which is certainly our largest undertaking, we prepared our young specialists at NCR's plants, which assured the technological, technical, and production control capabilities of our facilities and personnel. Today we are in a position, together with corresponding Unis organizations and with the technical assistance of NCR, to provide production, installation, supervision and testing of processors and computer systems, all under our own direction," Durasovic explained.

Omer Micijevic, director of the Research and Development Center, and Miro Nihic, who is in charge of the new production program, noted that Unis has significantly reduced the need for domestic economic organizations to acquire computers abroad. Thus it is a matter of substituting for imports, since such computers can now be purchased within the country. In the meantime, the Mostar producer has developed significant contacts with domestic producers of electronics products and equipment. It is realistically estimated that the NCR "I 9020" computer can contain more than 40 percent parts and components of domestic manufacture. The first joint actions herald "full success" in efforts to speed domestic solutions in design and to increase the percentage of domestic components in new computer production constantly.

When at the beginning of the last intermediate plan period in 1976 Unis began implementing an ambitious development program for the electronics industry in Mostar, few believed that in a relatively short time "future production" would reach such scope on the banks of the Neretva. From year to year, the small plants followed the rocky path to master world technology, while constantly expanding production of electronics and telecommunications equipment. It began with a plant for producing electronic calculators ("Unis-term"), from which shortly developed production for telecommunications in "printed circuits," electrodes for special purposes, and intensive strengthening of engineering functions. Today a strong nucleus of the electronics industry has emerged here. It employs more than 600 workers, all of whom are young, highly trained personnel who successfully assimilate new technology.

From one year to the next, the chronicler of economic trends in Mostar has been able to record an abundance of fresh information on the achievements of the electronics industry on the banks of the Neretva.

New Computer Types

The "Unis-term" calculating machine plant produced and marketed 4,000 calculators in 1983, containing 90 percent domestically-produced components. This is a great success, particularly if we realize that until 4 years ago, all components for calculators were imported. In the past year alone, the direct effects of substituting domestic components for imports surpassed 350,000 FRG marks, while imports were reduced to just four parts that, at the moment, domestic producers cannot provide.

Sasa Pehar, director of "Unis-term," spoke with us about the new production plans. They are working intently on mastering new types of calculators. One of the freshest undertakings is production of calculators of the Screen-Track type, for which fully 150 various parts have already been produced "under their own roof" and in cooperation with other domestic producers. This year 5,000 such calculators will be produced, and the market for them is assured.

The creative spirit of the young electronics experts in the telecommunications plant is also active. In the past few years, confronted by the challenge of the moment, they have mastered production and design of the most modern means of communications and appliances, service equipment and complete engineering for purchasers.

Ilija Kozul, director of the Unis-Telecommunications Equipment Plant labor organization, told us: "In the course of last year we accomplished new successes in producing telecommunications equipment. We began with production of analog multiplex systems, but in the meantime, in cooperation with the Swedish Erikson firm, we also began production of so-called digital multiplex devices of the most modern design, which this worldwide firm recently began marketing. To be precise, they are radio-relay devices for wireless transmissions of up to 120 calls. It is not well known that the Mostar plant performed a major task in filling the needs of the 1984 Winter Olympic Games in Sarajevo by installing the most modern digital multiplex devices and transmission equipment for the Sarajevo Post-Telephone-Telegraph system. The equipment's high quality was widely recognized. It is also significant that in this type of equipment, we are proceeding apace to complete domestic designs so that gradually we can achieve independence in production. In the past few years, the Telecommunications Equipment Plant has offered to world markets a wide spectrum of designs, products, installation and services for the needs of PTT communications, railroads and other branches of the economy. The specialists of this young collective are with growing success penetrating the most subtle secrets of one of the most complicated types of production.

Road to Independence

Unis in Mostar has also specialized in the production of specially-clad electrodes for hand electron beam welding; these electrodes find applications in the metals industry, shipbuilding, construction, machinebuilding, petrochemicals, processing and other industries. This year's entire production was contracted for sale in advance, and the Electrode Plant is constantly trying to improve its utilization of domestic components. For certain types of electrodes, domestic components have been found, while domestic parts are being sought for new products as well.

Along with mastering world technological accomplishments in electronics and telecommunications, the Unis plants in Mostar have been very successful in finding domestic solutions and achieving foreign exchange savings in their production. Stipe Rozic, director of the TAMP [The Tool, Metal and Plastics Plant] basic organization of associated labor, noted that

this facility had grown as a logical consequence of accelerated development of the Mostar electronics industry. Without a well-equipped tool plant, it is nearly impossible to assure stable development of this type of production. Until recently, nearly all electronic products required imported parts and semimanufactured materials. Now, solid foundations are being laid for finding the path to independence through Yugoslav strengths. Thus the TAMP plant is already equipped for the production of tools for spraying plastics, for pouring rubber, for deep extrusion and drilling, and for various assembly tools. Tools for pressure casting of various nonferrous metals are being developed. Plastic parts can be produced by spraying and vacuum processes, as can vital small metal parts. TAMP's production is constantly being expanded, and new shifts are in the works to employ another 50 workers in its operations.

Electronics and telecommunications production in Mostar have reached dimensions that require transformation to a new method of organization. Several labor organizations in the same locality will be transformed into a single labor organization with combined research, development and engineering departments. Work is already being accelerated to achieve this goal. The Unis system has already decided that the future development of the electronics industry in Bosnia and Hercegovina should be accomplished in cooperation with domestic producers of tlectronic equipment, primarily for the sake of plan development of this industry and joint discovery of solutions to design problems that will hasten substitution of domestic parts for imported ones.

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